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ABSTRACT

This study investigated children's moral and ecological conceptions and values about an actual, environmentally destructive accident, the large oil spill that occurred in Prince William Sound, Alaska in 1989. Sixty children from second, fifth, and eighth grades were interviewed on children's reasoning and understandings about the oil spill which caused extensive environmental harm. Questions focused on children's understandings and valuing related to the effects of the oil spill, children's morally obligatory reasoning about the oil spill, children's justifications, and children's conceptions of what it means to live in harmony with nature. The findings showed that the large majority of the children understood the oil spill negatively affected the local environments, it mattered to the children personally that harm occurred to the environments, and children distinguished between harm wrought to marine life by human activity and by other aspects of nature. The majority of children conceived of the harm caused to the shoreline as a violation of a moral obligation. Children in grade two less often generalized their prescriptive judgments compared to the children in grades five. Contains 41 references. (AP)

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# Children's Moral and Ecological Reasoning about the Prince William Sound Oil Spill

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Colby College

Paper presented at the June 1995 annual meeting of the Jean Piaget Society, Berkeley, California

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Children's Moral and Ecological Reasoning about the

Prince William Sound Oil Spill

It is both a surprise and concern that, to date, developmental psychologists have remained largely silent in seeking to understand the development of the human relationship with nature. A surprise, because it would seem apparent that deep and abiding environmental sensitivities and commitments form during childhood (Chawla, 1988; Kellert, 1985; Nabhan, 1994; Tanner, 1979; Ulrich, 1993). A concern because our environmental problems, locally and globally, do not quit. On both counts, theoretical and applied, developmental psychologists have important and exciting contributions to make.

In recent years, we have moved in this direction. Two studies in particular -- one conducted in the United States, another in Brazil -- help to set the context for this current investigation.

In one study (Kahn & Friedman, in press), we examined the environmental views and values of African American children (across grades 1, 3, and 5) in an urban community of Houston, Texas. Results showed that the serious constraints of living in an economically impoverished urban community cannot easily squelch these children's diverse and rich appreciation for nature, and moral responsiveness to its preservation. For example, based on social-cognitive interviews, the large majority of children said that animals, plants, and parks played an important part in their lives. Children talked about the environment with family members, and reported on conversations that focused on litter, air and water pollution, plants, and animals. Over half of the children themselves had started such conversations. Assessments were also made of children's judgments of throwing garbage in their local waterway (a bayou). The large majority of children believed that such an action would harm birds, water, insects, local people, and the view. Children also said that it would matter to them if such harm occurred. Moreover, assessments were made of whether children conceived of throwing garbage in a bayou as a violation of a moral obligation. This assessment of obligation drew on the moral philosophical literature (e.g., Gewirth, 1978; Rawls, 1971) and moral-developmental literature (e.g.,

Kahn, 1991, 1992; Nucci, 1981; Smetana, 1983; Turiel, 1983), wherein a moral obligatory judgment is prescriptive, independent of local cultural practices and laws, and generalizable to other people and cultures with different practices and laws. Results showed that the large majority of children conceived of throwing garbage in the bayou as a violation of a moral obligation.

Our findings can be further understood within a structural-developmental framework. In its broadest contour, two forms of moral-ecological reasoning were characterized: homocentric and biocentric. In justifying the protection of nature, homocentric reasoning focused on the interests of humans. In other words, the environment was given consideration in so far as harm to nature harmed human interests. With much less frequency, children drew on a biocentric form of reasoning wherein nature itself was granted moral standing (such as a right to life).

Moreover, there were suggestive findings that perhaps biocentric reasoning arises through the hierarchical integration of homocentric reasoning. For example, when children accorded rights to animals, such reasoning was not in contradiction to according rights to humans, but often enlarged the scope of what has moral standing (e.g., "bears are like humans, they want to live freely"). Similarly, biocentric reasoning often extended the idea of caretaking to include not only humans but animals and plants. This idea of hierarchical integration can be thought of in Piagetian terms: In the same way that it can be said that formal operations does not negate the place or importance of, say, class inclusion, but integrates it within a more comprehensive logical structure, so, too, was the following tentative proposition advanced: that perhaps homocentric reasoning remains influential psychologically while forming part of a more comprehensive moral environmental structure. This tentative proposition was investigated further in the current study.

During this first study, another important question arose. To what extent were the analyses and results marked by culture and context, and to what extent might they suggest universal features of children's development? In response, a colleague and ourselves (Kahn, Howe, & Friedman, 1995; Howe, Kahn, & Friedman, in preparation) modified the methods from the first study and interviewed in Portuguese 44 fifth-grade Brazilian children who lived along the Rio Negro in either the city of Manaus

(the capital of the state of Amazonas) or a small remote village a day's journey up river. Results showed remarkable similarities between these children in Brazil and the United States in terms of their environmental interests, orientations, and moral commitments. In addition, the coding system that was used to code the Brazilian children's environmental moral reasoning virtually replicated the system developed in the United States study, and this system proved robust enough for the task.

From these two studies emerges a promising approach toward investigating children's moral-ecological conceptions and values. However, such studies need to be extended and deepened if they are too lead -- as we would like -- toward an ontogenetic framework for understanding children's relationship with nature.

It is within this context, that the current study can be placed. Sixty children were interviewed on their moral and ecological understandings of the Prince William Sound oil spill. The interviews took place less than a year after the actual oil spill occurred, and thus allowed an investigation into children's reasoning about an actual (as opposed to hypothetical) environmental accident which caused extensive environmental harm. Issues focused on whether it is alright if various forms of environmental harm occur (e.g., to beaches and shoreline, animals, and endangered species), whether such harm matters, and whether children's judgments about the types of environmental harm caused by a large oil spill reflect moral obligations. Other lines of inquiry focused on children's understanding of what it means to live in harmony with nature, and whether harm to animals caused by humans differs from harm to animals caused by other animals (nature).

## Methods

Subjects. Sixty children of mixed ethnicity were interviewed, twenty children (about evenly distributed by gender) in each of three grade levels: second, fifth, and eighth. The children were selected from two schools in Houston, Texas.

Procedures and Measures. Each child was individually administered a semistructured interview that lasted approximately 40 minutes (cf. Damon, 1977; Lave, 1988; Nucci & Turiel, 1993; Ogbu, 1977; Piaget, 1929/1960; Saxe, 1990). The interviews were tape-recorded and later transcribed for

analysis. The interviews were conducted less than one year after the Prince William Sound oil spill occurred in Alaska. At the onset of the interview, children's prior knowledge was assessed about two things. One was oil ("Do you know what oil is -- the type that comes from the ground? What does it look like? Do you know some of the things people use oil for?"). The second was the Prince William Sound oil spill itself ("Did you hear about the oil spill that occurred last year in Alaska? What did you hear about it?") All subjects knew something about oil in general, and the majority of children had heard something about the oil spill. The interviewer pursued this conversation until basic facts were understood ("A big oil tanker which is a huge boat accidentally hit large rocks. The whole boat was filled with oil, and almost all the oil spilléd into the ocean. Over ten million gallons of oil spilled into the ocean. That's a lot of oil. This was the biggest oil spill that we've ever had in our country"). Then the interview focused on four major areas.

First, children's understandings and valuing related to the effects of the oil spill were assessed. One question focused on shoreline ("How do you think the oil spill affected the local beaches and shoreline in Alaska?). Similar questions focused on the effects on fish and animals, fishermen, recreational users, and the oil company that accidentally spilled the oil. Other questions focused on whether it mattered to the subject personally that the shoreline was harmed by the oil spill, and that marine life was harmed by the oil spill ("Does it matter to you that because of the oil spill, oil covered hundreds of miles of beaches and shoreline?"). Another question focused on whether harm to animals caused by human activity (transporting oil) differed from harm caused by other animals ("In nature, fish often eat other fish in order to live. Thus in nature many fish get killed. Is this different from fish dying in an oil spill?").

Second, children's morally obligatory reasoning about the oil spill was assessed. Three questions pursued reasoning about the effects on the shoreline. One question focused on whether the act was viewed prescriptively ("Is it all right or not all right that the oil spill covered hundreds of miles of beaches and shoreline in Alaska?"). A second focused on whether the previous judgment depended on legal sanction ("Let's say the law said that it doesn't matter that shoreline gets covered with oil,

would it then be all right or not all right that shoreline got covered with oil in the Alaskan oil spill?"). A third question focused on the generalizability of previous judgment ("Let's imagine that the oil spill happened in a different country a long ways away, and in that country people didn't care that oil covered shoreline. Would it then be all right or not all right for their country that oil covered their shoreline?"). This same series of three questions was then asked regarding marine life (e.g., "Does it matter to you that because of the oil spill many fish and animals died in Alaska?").

Third, children's justifications were elicited for the ten questions (above) that involved valuing and moral obligation. These questions were initially elicited by the interviewer asking "why?" after the subject provided an evaluation, and then pursued by other means (e.g., "can you say more about that?"). Multiple justifications were encouraged (e.g, "are there any other reasons?").

Fourth, children's conceptions of what it means to live in harmony with nature were assessed ("One student I talked with said that it was wrong for the oil spill to have occurred because it's important for people to live in harmony with nature. What does it mean to you to live in harmony with nature? Can you give an example of what it means? How do you know if someone is living in harmony with nature?").

Coding and Reliability. A coding manual was first developed from the responses of 50% of the children, a total of 30 children, with 10 from each age group. The coding manual was then applied to the responses from the other 50% of the children. The results from both groups were combined for analyses. Three types of responses were coded. Dichotomous evaluation responses (e.g., all right/not all right, matters/does not matter), justifications for evaluative responses (e.g., an appeal that animals have rights), and conceptions of living in harmony with nature (e.g., respect for nature). Parts of the justification coding system drew on coding systems developed elsewhere (Davidson, Turiel, & Black, 1983; Kahn & Friedman, in press; Kahn & Turiel, 1988; Kahn, 1992). Summary descriptions on the most general level of the justification coding system are presented in Table 1, and for the harmony conceptions coding system in Table 2. An independent coder trained in the use of the coding manual is currently recoding 25% of the data to assess intercoder reliability.

Insert Tables 1 & 2 about here

## Results

Non-parametric tests (e.g., Marascuilo & McSweeney, 1977) were used for tests of statistical significance of the categorical data. No gender differences were found, and thus gender data were collapsed. Age differences were found where reported. It should be highlighted at the onset that our entire set of analyses are not yet complete.

Children's Understandings and Valuing Related to the Effects of the Oil Spill. As shown in Table 3, the large majority of the children understood that the oil spill negatively affected the local Alaskan shoreline (75%, 95%, and 100% in grades 2, 5, and 8, respectively), marine life (100%, 100% 100%), fishermen (95%, 100%, 100%) recreational users (100%, 100%, 100%), and the oil company (81%, 100%, 100%). When negative effects were not recognized, it was mostly by children in grade 2 compared to 5 and 8. For the shoreline: $X^2 = 7.35$, $p < .03$. For the oil company: $X^2 = 7.73$, $p < .03$. The two explicitly nature-oriented conditions (shoreline and marine life) were examined for whether it mattered to the children that such harm occurred. Results showed that of the children (above) who had believed that harm had occurred, the majority said that it would matter to them that harm occurred to the shoreline (79%, 100%, and 79%) and marine life (95%, 95%, and 95%). Children also said that it was different if the harm to marine life was caused by human activity (transporting oil) compared to harm caused by other animals (90%, 95%, and 95%).

Children's Morally Obligatory Reasoning about the Oil Spill. The two explicitly nature-oriented conditions (shoreline and marine life) were used to assess children's morally obligatory reasoning. As shown in Table 3, by and large the majority of children said that it was not alright that the oil spill harmed the shoreline and marine life (prescriptivity), that such harm would not be all right even if a law allowed for it (rule contingency), and it would not be all right even if it happened in a far off place where people thought the act would be all right (generalizability). The main exception to this pattern

occurred with the second grade children who tended less frequently to generalize their prescriptive judgments (74% for shoreline and 58% for marine life). If one assesses moral obligation by means of a conjunction of all three criteria it would appear (although the statistics have not yet been performed here) that in comparison to the two older groups, the second graders less often conceived of harm to the environment in terms of moral obligation.

Children's Moral and Ecological Justifications. Children's justifications for their evaluative judgments were elicited for ten questions that involved valuing and moral obligation. The resulting justifications were coded with the categories reported in Table 1. Collapsing results across all ten questions, and between categories, preliminary quantitative results show the following percentages of use: Homocentric (57%, 57% and 60%, for grades 2, 5, and 8, respectively); Biocentric (10%, 17%, and 18%); Harm to Nature (32%, 26%, and 23%). A fine-grained quantitative analysis of this data is in progress.

Children's Conceptions of What it Means to Live in Harmony with Nature. Children's conceptions of harmony were coded with the categories reported in Table 2. The quantitative results are reported in Table 4. (The results in Table 4, however, need to be qualified in that 2nd graders provided fewer multiple reasons than did fifth and eighth graders. A full accounting of these numbers awaits our revision of this manuscript.)

Results show that the large majority of 2nd graders (and less so for children in grades 5 and 8) conceived of harmony in terms of acting upon the environment. Children's reasoning often focused on not performing negative acts:

> It [Harmony] would mean you're doing great with not littering, not polluting the air. (grade 2)
>
> Like no harm happening. (grade 2)
>
> Like to not go out and kill animals...and when you go to the beach or something, don't litter or contaminate the water with different things. (grade 8)

Other times, reasoning focused on performing positive acts.

> [Harmony means] be nice to the animals, and try to feed them. And try to be like the environmentalists...be helpful and try to tell them (others) to help the animals and plants. (grade 5)
>
> Oh, they'd be nice, they would come out and water their plants. (grade 5)

In both cases, positive and negative, the reasoning focuses on overt actions ("don't litter," help the animals"). In contrast, the older children more often conceived of harmony in more abstract moral terms, such as respect for nature –

> [Harmony] means to respect lower life forms and respect animals when you see animals like some people...I've seen animals get hit in the street and people see the animals they just don't give it time to get across. I think you should stop just like if it was a child walking across the street and let the animal pass and keep going and always treat animals right. (grade 8)
>
> [Harmony] means to me the same thing as respecting the animals and being, respect our environment. (grade 5) –

or being in balance with nature:

> It's important to keep the scales balanced, or as you say keep it in harmony....[Harmony is] taking from nature small amounts, but putting back what you take. (grade 5)
>
> Living in harmony is to be equal with other people or to be equal to those below us and not always try to take...not to take more than we give. (grade 8)
>
> Like when you go hunting or something don't kill more animals than you really need to just kill...like if you had intentions of killing some animal and then put some in the freezer just kill how many you would need for one or two days that's it don't go wild try to save everything...don't ever just kill off a whole lot of things and save it. (grade 8)

In both cases, respect for and balance with nature, the reasoning employs moral concepts directly ("respect animals," "to be equal") or indirectly in terms of reciprocity ("to keep the scales balanced").

## Discussion

Most of the psychological research on children's moral development has investigated moral issues and situations which exist between people (e.g., Arsenio, 1988; Damon, 1977; Eisenberg, 1989; Gilligan, 1982; Helwig, 1995; Killen, 1990; Kohlberg, 1984; Laupa, 1991; Nucci, 1981; Selman, 1980; Smetana, 1989; Thorkildsen, 1989; Turiel, 1983; Wainryb, 1991; Youniss, 1980). But in what ways does it make sense to talk about a moral relationship not with other people, but with nature? Such a question is puzzling for the criteria that usually help establish human ethics are not present, or at least not fully

present, in the natural environment. For instance, when we say we have a moral obligation not to harm other people (e.g., physical assault), we recognize that other people, like ourselves, can feel pain and hold certain rights (e.g., to life and liberty). But what then does it mean to say that we have an obligation not to harm the natural environment? Does the natural environment feel pain? Does it have rights? Or is moral obligation an inappropriate construct by which to understand the moral relation of humans with nature?

This study speaks to these questions. The results reveal a range of environmental and moral commitments that children brought to bear in their reasoning about an actual, environmentally-destructive accident: the oil spill the occurred in Prince William Sound, Alaska in 1989. Results showed, for example, that most of the children from Houston understood that the oil spill negatively affected the local Alaskan shoreline, marine life, fishermen, recreationists, and the oil company. It also mattered to the children personally that harm occurred to the shoreline and marine life, and children distinguished between harm wrought to marine life by human activity (an oil spill) and by other aspects of nature (other marine life).

Children's morally obligatory judgments were assessed (for purposes of this preliminary paper) using three criterion judgments: prescriptivity (that the act was judged not all right), rule contingency (that the prescriptive judgment did not depend on societal laws), and generalizability (that the prescriptive judgment generalized to people in a far off location who believed differently). Results showed that the majority of children conceived of the harm caused to the shoreline and marine life as a violation of a moral obligation. This finding is consistent with our recent studies with children in an urban African-American community in Houston, and in urban and rural locations in the Brazilian Amazon. Thus it appears that moral obligation can be an appropriate construct by which to understand children's relationship with both non-sentient and sentient parts of nature.

At the same time, children in grade 2 less often generalized their prescriptive judgments (74% and 58% for shoreline and marine life, respectively) compared to the children in grades 5 (100%, 95%) and 8 (95%, 95%). This developmental finding is consistent with our data from the African-American

children, where 68% of the children in grade 1 generalized their prescriptive environmental judgment, compared to 91% and 100% of children in grades 3 and 5, respectively. Some (but not all) other studies using prototypical moral stimuli involving issues of fairness and welfare between humans have similarly found that younger children less frequently generalize their prescriptive judgments (see Turiel, 1983). This phenomenon has yet to be fully understood (cf. Glassman & Zan, in press).

In our previous research, it has been difficult to articulate a robust conception of biocentric reasoning. Part of the difficulty may be that such reasoning more fully emerges in adolescence. If this is correct, a full account awaits further studies with an older population. That said, this current study moved in this direction by including an eighth grade population. As summarized in Table 1, numerous biocentric subcategories emerged. Distinctions were made based on valuing biological life, inanimate objects, and natural processes. In addition, three forms of establishing intrinsic value arose based on establishing a similarity between humans and nature: direct (e.g., "like an animal...that's like a human being, they have brains, they're alive, they suffered, just like we suffer like an animal"), compensatory, and hypothetical. Similar forms arose in characterizing children's biocentric justice reasoning: direct, compensatory, conditional, and hypothetical (e.g., "You put yourself in the animal's position and you wouldn't like that and so if you just kind of trade places and think about it and everyone would think it wasn't right").

While our quantitative analysis of the justification data is not yet complete, at this point it is clear that the expected developmental trend (found in our previous study with African-American children) did not completely emerge. Namely, taking all ten questions together which were probed for justifications, biocentric reasons accounted for 10% of the justifications used by children in grade 2, compared to 17% and 18% for children in grades 5 and 8, respectively. Regardless of whether a statistical developmental difference exists (which is under examination), we were surprised by the comparatively high usage of biocentric reasoning among second graders, since we had found virtually no biocentric reasoning among first graders in the previous study. At stake is whether our previous

tentative proposition finds support: that in development biocentric reasoning hierarchically integrates homocentric reasoning.

At least, two explanations can be offered for this discrepant finding. The simplest is this. The African-American population we drew from in our previous study came from a school where over 60% of the children were considered "low-performing," meaning, performing at two or more grade levels behind state standards. If the development of moral environmental sensitivities and commitments depends partly on cognitive development and education -- and we see no reason to think otherwise -- then it could follow that the children in grades 2 and 5 in the current study were developmentally quite a bit more advanced than in the previous study. In other words, it may be that the different populations can explain the findings, and that the initially proposed developmental pathway remains roughly correct.

Another plausible -- and far more complex - explanation is this: that we are partly tapping a biocentric orientation with second graders because in fact something along biocentric lines develops in early childhood. It certainly does seem plausible that young children often experience a close connection with the natural world, and form affinities with and values for nature. Indeed, Wilson and his colleagues (e.g., Katcher & Wilkins, 1993; Kellert, 1993; Nelson, 1993; Ulrich, 1993; Wilson, 1984, 1992, 1993) have suggested that such early affiliations can be partly explained by functional evolutionary theory (biology, genes, and genetic fitness). If such accounts have some merit, what remains unclear is how children's early affiliations with nature take shape and form conceptually, and how seemingly sophisticated moral conceptions (centered on notions of rights, freedoms, justice, equality, and respect) become central to children's environmental moral reasoning.

Taken on its broadest level, it is these sort of issues that our research program is taking up. We aim toward a cross-cultural framework for understanding ontogenetically the human relationship with nature: an understanding that is sensitive to biological constraints and culture influences, while articulating clearly developmental processes and pathways.

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Table 1

Summary of Environmental Justification Categories

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1. Homocentric: An appeal to how effects to the environment affect human beings. In other words, the environment is given consideration, but this consideration occurs only because harm to the environment causes harm to people.

| | |
|---|---|
| Personal Interests | An appeal to personal interests and projects of self and others, including those that involve recreation or provide fun, enjoyment or satisfaction ([it matters] "because they can't have their favorite food or do their hobby"); "because I like to go fishing"; "[because] no one would be able to go swimming in Alaska"). |
| Relational | An appeal to a relationship between humans and nature, including those based on psychological rapport ("you could say that if it weren't for animals, you might feel lonely"). |
| Welfare | An appeal to the physical, material, and psychological welfare of human beings, including that of self ("yes, it [the oil spill] really does matter to me because of the spreading it might damage me, damage my body"), of other individuals ("now more people will die because they can't support themselves [because the fish died]"), and of individuals within a larger systemic social context ("it's not all right because we're killing the fish, we're killing the economic process of that state") or ecological context ("it wouldn't be all right because like if it was in Australia or somewhere it would eventually pass on to us and mess up, because we're all the world, you know, and it's going to eventually come to us"). |
| Educative | An appeal to the potential for humans to learn from nature ("because if we lost the endangered species of the fish in the oil spill, we won't be able to learn physically and mentally from them"; "[because] one species might have something really neat about it that people really like, but they never got to study it") |
| Punishment Avoidance | An appeal to punishment or its avoidance ("[because] they might get in trouble or something because they should have done something about it"). |
| Justice | An appeal to fairness or the rights of other humans ("it's not all right because everyone has a right to work"), including a focus on locus of responsibility ("because it goes back to morals and ethics, if you make a mistake, clean it up; it doesn't matter were you are or who you are, if you make a mistake, clean it up") and unjustified harm ("because these innocent people and all of a sudden they don't have any recreation because of some fault we did") |

Table 1 (continued)

Summary of Environmental Justification Categories

| | |
|---|---|
| Aesthetics | An appeal to preserving the environment for the viewing or experiencing pleasure of humans ("because we might not see them beautiful fish no more if they were killed"; "I don't really enjoy looking at a dead fish"). |

2. Biocentric: An appeal to a larger ecological community of which humans may be a part.

| | |
|---|---|
| Intrinsic Value of Nature | An appeal that nature has value which is derived not only from human interests, including a focus on biological life ("because fish are just as important as other things, if the fish dies, then we won't have any fish, and fish are part of this earth, and I think they should be treated as well as anything else"), establishing value equivalencies between other life forms and humans ("because if it was human lives, then it would still be the same thing, it wouldn't be all right because it's, you know, it's lives"; "like an animal, you can't just make one that's exactly like it was before, that's like a human being, they have brains, they're alive, they suffered, just like we suffer like an animal -- we are an animal"), a focus on natural processes ("it isn't part of nature to make an accident and kill the fish"), or a focus on the teleos of nature ("without animals the world is like incomplete, it's like a paper that's not finished"; "animals are part of the environment, if you have a car, and you have everything but the motor, it's no good -- it's kind of like the environment"). |
| Justice | An appeal that nature has rights or deserves respect or fair treatment ("it's not all right because I think every creature, people, or thing or whatever has a right to live"), including appeals to unjustified harm ("It's not all right that the oil spill killed many animals because I don't think it was their fault"; "it killed the animals that were living, the innocent little creatures"); or established by means of a direct relation between humans and nature ("because I think fish and animals have a right to live just like we do, and it's not fair to have killed them this way"), a compensatory relation ("just because of their appearance and they can't talk, they're animals, and I don't think that's right, they could be people if they could talk, a form of people, well not human beings but something like it, just a degree of level and that's it, that's the only difference); a conditional relation ("it's not all right because they're dead living things just like we are, you wouldn't want anybody to kill you like that"); or an hypothetical perspective- taking relation ("you put yourself in the animal's position and you wouldn't like that and so if you just kind of trade places and think about it and everyone would think it wasn't right"). |

Table 1 (continued)

Summary of Environmental Justification Categories

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3. Unelaborated Harm to Nature: Although no reference is made to whether appeals for nature derives from a homocentric of biocentric orientation, such appeals include a focus on animals ("it could harm other animals that live in the sea that I don't know about"), plants ("if he chopped down too many trees there would be no forest"), non-living parts of nature ("the sand and the water got contaminated"), species ("because lots of animals are being extinct -- there won't be anymore"), food chains (because "it could break the food web, or let's say a land animal ate birds, well the birds died because of the oil spill, see if you break up the food chain the higher predators up pay for it"), and ecosystems ("it wouldn't be all right because if the animals die, the land wouldn't be fertilized to grow plants, and animals need plants to eat, and when the animals give out carbon dioxide, plants suck it in to make oxygen, and the animals need oxygen to live").

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Table 2

Children's Conceptions for Living in Harmony with Nature -- Summary of Categories

| | |
|---|---|
| Possessing | Conception based on having or possessing aspects of nature ("[harmony means] flowers in your yard, a big house"). |
| Acting Upon | Conception based on doing something to or for nature, including positive acts ("[harmony means] be nice to animals and try to feed them, and try to tell others to help the animals and plants") and negative acts ("[harmony] would mean you're doing great with not littering, not polluting the air"). |
| Experiencing | Conception based on experiencing or interacting with nature ("[to live in harmony] have the experience of coming in contact with nature; go in the woods and have an experience, like go out there for a couple of days -- go camping"). |
| Educative | Conception based on learning from nature ("[to live in harmony] learn from the animals; if we start to look at animals as an example, then maybe we can change ourselves"). |
| State of Mind | Conception based on experiencing a particular state of mind or feeling ("[you know someone is living in harmony with nature] by their expression toward life, how some people wake up in the morning and say, 'It's a glorious day,' they love that day, and they are happy"). |
| Relational | Conception based on a relationship between humans and nature ("the meaning of harmony to me, it's like living together, and take care of things in a way you know that they are really special to you; it's just like it's your only child you can have, you love your child, it's just like loving animals like dogs and all of that"). |
| Respect for Nature | Conception based on respecting nature ("[harmony] means to respect lower life forms and respect animals when you see animals"). |
| Balance with Nature | Conception based on being in balance with nature, through a sense of either proportion ("[harmony means] like when you go hunting or something don't kill more animals than you really need") or equality ("it's important to keep the scales balanced, taking from nature small amounts, but putting back what you take"). |

Table 3

Children's Ecological and Moral Judgments About Effects of the Prince William Oil Spill

| | Shoreline | | | Marine Life | | | Fishermen | | | Recreationists | | | Oil Company | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Judgments | 2nd | 5th | 8th | 2nd | 5th | 8th | 2nd | 5th | 8th | 2nd | 5th | 8th | 2nd | 5th | 8th |
| Assessment of Affect: (Negatively affected by the oil spill) | 75 | 95 | 100 | 100 | 100 | 100 | 95 | 100 | 100 | 100 | 100 | 100 | 81 | 100 | 100 |
| Assessment of Value: (Matters that it was affected) | 79 | 100 | 79 | 95 | 95 | 95 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Local Act Evaluation: (Not all right that harm occurred) | 95 | 100 | 100 | 94 | 100 | 95 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Rule Contingency: (Not all right even if a law allows it) | 89 | 100 | 100 | 95 | 100 | 100 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Generalizability: (Not all right even if it happened in a far away place) | 74 | 100 | 95 | 58 | 95 | 94 | --- | --- | --- | --- | --- | --- | --- | --- | --- |

Note. "---" denotes that the question was not asked.

Table 4

Percentages of Conceptions of Harmony by Category

| Conception of Harmony | 2nd | 5th | 8th |
|---|---|---|---|
| Possessing | 0 | 2 | 0 |
| Acting Upon | | | |
| Negative Acts | 71 | 32 | 29 |
| Positive Acts | 18 | 32 | 16 |
| Experiencing | 0 | 2 | 13 |
| Educative | 0 | 2 | 3 |
| State of Mind | 6 | 0 | 8 |
| Relational | 0 | 10 | 8 |
| Respect for Nature | 0 | 7 | 5 |
| Balance with Nature | 6 | 12 | 18 |

Note. Percentages may not equal 100 due to rounding.